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Notice of Allowability	Application No.	Applicant(s)	
	10/749,349	PARK ET AL.	
	Examiner	Art Unit	
	Mike Stahl	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.
2. ☒ The allowed claim(s) is/are 1-8.
3. ☒ The drawings filed on 31 December 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>12/31/03</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

- Replace claim 1 with the following version:
 1. A focusing waveguide grating coupler using a leaky mode, comprising:
 - a substrate having a first refractive index n_1 ;
 - a first core layer having a second refractive index n_2 , the first core layer being formed on the substrate;
 - a second core layer having a third refractive index n_3 , the second core layer being formed on the first core layer apart from the first core layer with a space d in between;
 - a first cladding layer having a fourth refractive index n_4 , the first cladding layer being formed on the second core layer;
 - a second cladding layer having a fifth refractive index n_5 , the second cladding layer being formed on the first cladding layer and inserted between the first core layer and the second core layer; and
 - a Fresnel lens positioned on the second cladding layer,
 - wherein the refractive indexes satisfy conditions of $n_5 > (n_2, n_3) > n_1$ and $n_5 > n_4$;
 - and light inputted through the first and second core layers propagates to the Fresnel lens

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as radiated leaky beams by a leaky mode formed according to the conditions, and the leaky beams form an optical focus by performing single directional coupling towards the lower part of the substrate by using beams reflected from the Fresnel lens.

The amendment to claim 1 includes the following changes. Every instance of “refraction index” was changed to “refractive index” in order to be more consistent with conventional terminology. “satisfies” was changed to “satisfy”. “propagates” was inserted between “first and second core layers” and “to the Fresnel lens”, and “refracted from the Fresnel lens” was changed to “reflected from the Fresnel lens”. The latter two changes clarify the claim and are not regarded as altering its scope; support for those changes is found in the description at p. 13 lns. 11-16.

Allowable Subject Matter

Claims 1-8 are allowed. Claim 1 involves an improvement to a focusing waveguide grating coupler, in which the overall waveguide structure is configured to develop a leaky mode such that more of the input light reaches the Fresnel lens, which in turn enables more light to reach the focal point on the substrate side of the lens. The recited structure is not anticipated by or obvious in light of any of the references of record. The closest reference identified during the search is US 4861128, which discloses a pair of waveguide core layers and a focusing grating coupler. However, that reference differs from the claimed invention at least in that the Fresnel lens is positioned on the upper core layer rather than on a second cladding layer, and in that the light is not focused toward the lower part of the substrate. US 6436613 also discloses a multiple

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layered waveguide with a grating coupler but the device does not meet all the structural and functional limitations of claim 1. Claims 2-8 are allowed by dependence from claim 1.

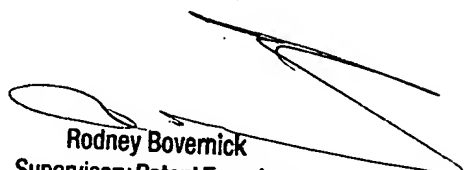
Conclusion

Inquiries about this letter should be directed to Mike Stahl at 571-272-2360. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to the technical support staff supervisor at 571-272-1626. Official communications which are eligible for submission by facsimile and which pertain to this application may be faxed to 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJS

Mike Stahl
Patent Examiner
Art Unit 2874

August 18, 2005



Rodney Bovernick
Supervisory Patent Examiner
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